ADC

TELECOMMUNICATIONS

TECHNICAL MANUAL
EXHIBIT II

(PRELIMINARY)

BTS-7010

MULTI-CHANNEL (BROADBAND) BOOSTER

REV: 0

102 Rahway Road
McMurray, PA 15317 USA
Phone 412-941-1500
FAX 412-941-9421

BTS-7010
MULTI-CHANNEL BOOSTER

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SYSTEM DESCRIPTION

The BTS-7010 Multi-Channel Booster is a digital broadband booster designed to operate with a maximum of four simultaneous input signals. The BTS-7010 is capable of operating as a wireless video/data transmitter at a nominal power level of 5.0 watts (total average). The unit is comprised of a 64 QAM modulator (Vyyo V300 Wireless Modem Termination System), frequency agile QAM upconverter (Wavecom MA4040D) and BTS-7010 Multi-Channel Booster. The WMTS receives full duplex Ethernet data frames (100BaseT), multiplexes the signal in TDM and modulates the signal to a 64 QAM, 44 MHz IF carrier. The IF output from the QAM modulator is upconverted to the superband (222 to 408 MHz) frequency of the desired channel by the QAM upconverter then directed to the input to the multi-channel booster where it is upconverted and amplified to the MMDS/ITFS frequency range (2500.00 MHz to 2690.00 MHz). The unit is utilizes ALC circuitry to automatically maintain output power and is designed to operate in a system with other identical booster units in an N+1 redundant configuration.

This manual covers the description, installation, set-up, operation, schematic and interconnect drawings, as well as other useful technical information.

TECHNICAL MANUAL DESCRIPTION

This manual has been provided to assist with the set-up, operation, and maintenance of the transmitter. This manual also offers a brief system description, block diagrams, interconnect, front panel description, rear panel description, and a specification sheet. If after reviewing this manual, you still have questions, please contact the ADC Service Company at (724) 941-1500. A Customer Service Technician will be glad to assist you.

SPECIFICATIONS: BTS-7010

Type of Emissions ..... BOOSTER
Frequency Range ..... (4 simultaneous channel operation maximum) 2500 to 2690 MHz
Output Power Rating ..... 5.0 watts (total average)
DC voltage and total current of final amplifier stage ..... 12 volts DC at 38 amps
(Class A - Not RF power dependent)

Performance Specifications

Operating Frequency Range ..... (4 simultaneous channel operation maximum) 2500 to 2686 MHz
RF output - Nominal:
Power 5.0 watts (total average)
Impedance ..... 50 ohms
Connector ..... Type N

Input: (WMTS) ..... 100BaseT Data Frames
Connector ..... RJ-45, shielded

Out-of-Band Power ..... Per FCC Rules 21.908
-25 dB max (at band edges)
-40 dB max (250.0 KHz above and 250.0 KHz below band edges)
-50 dB max (3.0 MHz above and 3.0 MHz below band edges)
-60 dB max (20.0 MHz above and 3.0 MHz below band edges)

Out-of-Band Power (Unoccupied Channel) ..... Per FCC Rules 21.908
-25 dB max (at unoccupied channel edges)
-40 dB max (250 KHz above and 250 KHz below unoccupied channel edges)
-50 dB max (3.0 MHz above and 3.0 MHz below unoccupied channel edges)

Harmonic Products ..... -60 dB max

Electrical Requirements

Power Line Voltage:
WMTS QAM Modulator ..... 110 to 230 VAC, 47 to 63 Hz
QAM Upconverter ..... 100 to 240 VAC, 50/60 Hz or
Broadband Booster ..... 85 to 264 VAC, 50/60 Hz or

Power Consumption:
WMTS QAM Modulator ..... 50 watts
QAM Upconverter ..... 40 watts
Broadband Booster (ea. Sector) ..... 675 watts

Environmental

Maximum Altitude:
WMTS QAM Modulator ..... 10,000 feet (3,048m)
QAM Upconverter ..... 10,000 feet (3,048m)
Broadband Booster ..... 12,000 feet (3,660m)

Ambient Temperature:

WMTS QAM Modulator	0° to 40°C
QAM Upconverter	0° to 40°C
Broadband Booster	0° to 50°C

Mechanical

Dimensions (WxDxH):

WMTS QAM Modulator	19”x 21” x 8.75”
QAM Upconverter (Upconverter Card)	1” x 13 x 5.25”
Broadband Booster :	
Band Pass Filter Chassis	17.20” x 24.36” x 6.97”
Power Amplifier/Power Supply Chassis	17.20” x 24.36” x 17.47”
Upper/Lower Signal Processing Chassis	17.20” x 24.36” x 17.47”
Control Chassis	17.20” x 24.36” x 8.72”

Weight:

WMTS QAM Modulator	12 lbs. (5.45 kgs)
QAM Upconverter (Chassis with Power Supply and Upconverter Card)	19.2 lbs. (8.8 kgs)
Broadband Booster	165 lbs. (75 kgs)

INSTALLATION PROCEDURE

UNPACKING

ADC certifies that upon leaving our facility, your equipment was undamaged and in proper working order. Please inspect all material upon arrival for any sign of damage. The shipping container should be examined for obvious damage indicative of rough handling. Remove the sled modules and all other material from the shipping container and check for damage: dents, large scratches, or broken connectors etc. Open the translator and remove all packing material from inside the unit and inspect for damage. Any claims against in-transit damage should be directed to the Carrier.

SITE CONSIDERATIONS

The BTS-7010 is provided with an environmentally controlled cabinet and therefore may be operated both indoor and outdoor. It is very important to verify that adequate AC power is available to the system.

Complete the following for equipment installation:

The unit is supplied with a cabinet, carefully remove the cabinet from the shipping container. If the individual sleds and chassis has been shipped separately, the internal shipping material must be removed from inside the cabinet before the tray is installed. Cut and remove the cable ties or cords which hold the tray harness breakouts to the tray slides. Carefully remove the foam packing material from around the cables, and connectors. Do **not** use a knife or other sharp object, as these may cut into the harness wires. Once the cabinet has been properly positioned, the trays can now be installed.

If each of the chassis do not align evenly, loosen the hardware holding the chassis in place. Move the tray accordingly and tighten the hardware again. Repeat if necessary until the all chassis are aligned evenly.

SYSTEM CHECK OUT AND OPERATION PROCEDURE

ELECTRICAL INTERFACE PROCEDURE

With the unit properly installed and adjusted in the equipment rack, the process of electrically interfacing the transmitter can begin. The following steps should be completed:

INSTALL AC LINE CORD.

A line cord is provided with each BTS-7010 Unit.. Insert the female connector of the line cord into the tray's AC input connector (J220). Make certain that the rear panel power switch is in the "OFF" position, then plug the line cord into an appropriate AC outlet to power the unit.

An alternate hard wire input is provided at jack J221. This alternate AC input may be used to connect directly to the system AC.

NOTE: The BTS-7010 was designed for 220 VAC 50/60 Hz. operation.

CAUTION: Never remove the RF output coaxial cables or otherwise unload the RF outputs while operating. This may cause harmful exposure to RF radiation.

CONNECT RF OUTPUTS AND RF INPUTS:

Connect the output coaxial cables from the Bandpass Filter RF Outputs (J201-J204) to the transmit antenna. Connect the UHF (222 to 408 MHz) output of the UHF tunners to the IF input of the BTS 1.0 (JJ231 – J234).

Connect the GPS antenna feed to the GPS Antenna input (J250). Connect 10 MHz input (J251) to 10 MHz reference if used.

INITIAL TURN ON PROCEDURE

Before beginning routine operation, the unit should be given a step-by-step check of its functions to verify proper interface and operation. This will give the operator a chance to become familiar with the unit. The following procedure should be followed for the initial turn-on of the unit:

1. APPLY AC POWER TO BTS-7010 UNIT.

Move the translator rear panel AC switch to the **ON** position. The Power Failure Warning and Switching Supply LEDs on the front panel of the Power Supply sleds will illuminate green. This indicates that the power supply is functioning normaly. If this is not the case, you should then refer to the troubleshooting section of this manual.

2. OPERATE UNIT

After System starts, observe LCD display on front panel of System monitoring sled. Select the appropriate transmitter sector (1 thru 4) by pressing the up-arrow. After selecting the desired sector, press the Operate (OPR) button. This should cause the transmitter to go into the Operate mode. (if not, refer to troubleshooting section).

3. MONITOR FORWARD OUTPUT POWER.

Now that the control and DC functions of the translator have been established as operative, observe the Forward power meter readings on the LCD display for the transmitter sector selected and check that the reading is approximately 100%.

4. MONITOR REFLECTED POWER.

Observe the Reflected power meter readings on the LCD display for the transmitter sector selected and check that the reading is below 5%..

5. RECORD LEVELS ON LOG SHEET

Once the transmitter is operating at full power, record all metered levels of the transmitter on a dated and initialed sheet. This sheet can be used for future comparison of the unit's operation. Comparing this information to the factory test data is always a good practice.

NORMAL OPERATION

Once the Installation and the Initial Turn-on are complete, operation is simple. With the AC ON/OFF switch in the **ON** position, the transmitter is activated by pressing the **OPERATE (OPR)** button next to the LCD display. This will now enable the transmitter. All of the green front panel operating status indicators should illuminate and the power metering should display a percentage of output power. To control the output power of the transmitter, adjust the ALC voltage (see procedure below). To turn the translator off simply move the translator to **STANDBY** and turn the AC ON/OFF switch to **OFF**.

A problem with the transmitter will usually reveal itself by a loss (either total or partial) of power. If there is no power at the output of the unit, check to see that the AC switch is **ON** and the transmitter is in the **OPERATE** mode. If so, consult the troubleshooting section of this manual.

Small changes in the output power are acceptable, but if the translator must be adjusted 10 to 20 percent or more to maintain the desired output power, there may be a problem in the amplifier section. Refer to the troubleshooting section of this manual.

1. ALC SET UP PROCEDURE

The output power of the transmitter is preset from the factory for an output level which corresponds to specifications. If output power needs adjusted, the ALC can be manually adjusted to give a lower or greater output.

- With the transmitter in **operate**, press the next button below the LCD display to view the ALC voltage. . The meter should indicate 0-8 volts when the average output power level is within the effective operating range of the ALC circuitry

- If the ALC voltage reading drops below 0 volts, this indicates that the input signal has risen above the ALC window and the red **High Input** indicator which is on the front panel will light.

- If the ALC voltage exceeds 8 volts, this indicates that the input signal has fallen below the acceptable ALC window and the red **Low Input** indicator will light.

  If either extreme is the case, place **SW1** into the **ALC1** position and adjust untill both **High Input** and **Low Input** LEDs are green.

2. ALC ADJUSTMENT

If the output power level needs to be adjusted, place the front panel switch **SW2** into the **ALC2** position and adjust **ALC2** potentiometer to set output power to 100% as indicated on Control Monitoring sled LCD display.

The ALC can be disabled by moving **SW2** to the manual (**MAN2)** position. The **MAN2 GAIN** potentiometer now becomes the direct adjustment for amplifier gain.

This completes the ALC set up for the Transmitter.

SYSTEM MONITORING AND CONTROL

The System Monitoring Assembly provides monitoring of system status signals through the front panel LCD display and control through five push buttons located directly below the LCD display: The Previous (PRV) and next (NXT) buttons are used to cycle through the various menus. The Up arrow (↑) is used to cycle through each of the transmitter sectors.

FUNCTION	PURPOSE
OPERATE/STANDBY	ENABLES AND DISABLES THE TRANSMITTER
FORWARD POWER	INDICATES PERCENTAGE OF RATED OUTPUT POWER (TYPICALLY 100%)
REFLECTED POWER	INDICATES PERCENTAGE OF REFLECTED POWER (TYPICALLY <5%)
ALC	INDICATES ALC VOLTAGE (0 to 8 VDC)
FORWARD POWER THRESHOLD	INDICATES FORWARD POWER FAULT THRESHOLD PIONT (TYPICALLY 50%)
INPUT SIGNAL	INDICATES INPUT SIGNAL TO UPCONVERTER IS PRESENT (TYPICALLY 'OK')
10 MHz REFERENCE	INDICATES THAT 10MHz REFERENCE SIGNAL IS PRESENT (TYPICALLY 'OK')
OUTPUT SIGNAL (UPCONVERTER)	INDICATES RF OUTPUT SIGNAL OF UPCONVERTER IS PRESENT (TYPICALLY 'OK')
PLL STATUS	INDICATES PLL CIRCUIT IS IN LOCKED TO REFERENCE (TYPICALLY 'OK')
DESIRED MODE	INDICATES DESIRED MODE OF OPERATION (OPERATE or STANDBY)
OUTPUT P.S.	INDICATES STATUS OF DC/DC CONVERTER MODULE ON POWER AMPLIFIER ASSEMBLY (ENABLED or DISABLED)
OUTPUT SIGNAL (POWER AMPLIFIER)	INDICATES RF OUTPUT SIGNAL IS PRESENT AT OUTPUT OF POWER AMPLIFIER (TYPICALLY 'OK')
BIAS VOLTAGE	INDICATES FET AMPLIFIER DEVICES HAVE PROPER BIAS VOLTAGE (TYPICALLY 'OK')
TEMPERATURE	INDICATES POWER AMPLIFIER IS WITHIN SAFE OPERATING TEMPERATURE RANGE (TYPICALLY 'OK')
POWER SUPPLY	INDICATES DC/DC CONVERTER IN POWER AMPLIFIER ASSEMBLY IS WITHIN OPERATING RANGE (TYPICALLY 'OK')
RELAY POSITION	INDICATES POSITION OF RELAY ON DOWNSTREAM SWITCH ASSEMBLY (TYPICALLY 'MAIN')

REAR PANEL CONNECTIONS

BANDPASS FILTER CHASSIS

CONNECTOR LABEL	CONNECTOR NUMBER	CONNECTOR TYPE	FUNCTION
SECTOR #1 RF OUTPUT	J201	N	PROVIDES RF OUTPUT FROM SECTOR #1 TRANSMITTER
SECTOR #2 RF OUTPUT	J202	N	PROVIDES RF OUTPUT FROM SECTOR #2 TRANSMITTER
SECTOR #3 RF OUTPUT	J203	N	PROVIDES RF OUTPUT OF SECTOR #3 TRANSMITTER
SECTOR #4 RF OUTPUT	J204	F	PROVIDES RF OUTPUT OF SECTOR #4 TRANSMITTER

POWER AMPLIFIER/POWER SUPPLY CHASSIS

CONNECTOR LABEL	CONNECTOR NUMBER	CONNECTOR TYPE	FUNCTION
ON/OFF	CB1	20A BREAKER	PROVIDES AC CONTROL AND CIRCUIT BREAKER PROTECTION
AC I/P	J220	IEC	PROVIDES AC INPUT TO THE TRANSLATOR
ALT AC I/P	J221	N/A	PROVIDES ROMEX KNOCK-OUT FOR ALTERNATE HARD WIRE AC INPUT

UPPER/LOWER SIGNAL PROCESSING CHASSIS

CONNECNTOR LABEL	CONNECTOR NUMBER	CONNECTOR TYPE	FUNCTION
DOWNSTREAM/UPSTREAM INPUT/OUTPUT SECTOR #1	J231	BNC	PROVIDES UHF I/O FOR SECTOR #1 TRANSMITTER
DOWNSTREAM/UPSTREAM INPUT/OUTPUT SECTOR #2	J232	BNC	PROVIDES UHF I/O FOR SECTOR #2 TRANSMITTER
DOWNSTREAM/UPSTREAM INPUT/OUTPUT SECTOR #3	J233	BNC	PROVIDES UHF I/O FOR SECTOR #3 TRANSMITTER
DOWNSTREAM/UPSTREAM INPUT/OUTPUT SECTOR #4	J234	BNC	PROVIDES UHF I/O FOR SECTOR #4 TRANSMITTER

CONTROL CHASSIS

CONNECTOR **Error! Bookmark not defined.** LABEL	CONNECTOR NUMBER	CONNECTOR TYPE	FUNCTION
PS ANTENNA	J250	BNC	PROVIDES INPUT FOR GPS ANTENNA
EXTERNAL 10 MHz REFERENCE	J251	BNC	PROVIDES INPUT FOR EXTERNAL 10 MHz REFERENCE
NETWORK CONNECTION	J252	RJ-45	PROVIDES CONNECTION TO EXTERNAL NETWORK

FRONT PANEL LED INDICATORS

SLED ASSEMBLY	REFERENCE	FUNCTION
BANDPASS FILTER ASSEMBLY	INTERLOCK STATUS	**GREEN** INDICATES THAT BANDPASS FILTER IS FUNCTIONING PROPERLY
BANDPASS FILTER ASSEMBLY	BACK-UP ACTIVE	**GREEN** INDICATES THAT BANDPASS FILTER IS OPERATING ON REDUNDANT TRANSMITTER / **AMBER** INDICATES THAT RF INPUT SWITCH HAS SWITCH TO BACK-UP BUT BACK-UP HAS NOT BEEN ACTIVATED
DOWNSTREAM OUTPUT SWITCH ASSEMBLY	INTERLOCK STATUS	**GREEN** INDICATES THAT A DOWNSTREAM OUTPUT SWITCH IS FUNCTIONING PROPERLY
DOWNSTREAM OUTPUT SWITCH ASSEMBLY	SECTOR 1	**GREEN** INDICATES THAT DOWNSTREAM OUTPUT SWITCH HAS SWITCHED TO SECTOR 1 TRANSMITTER / **AMBER** INDICATES THAT OUTPUT SWITCH HAS SWITCHED TO BACK-UP BUT BACK-UP DEVICES HAVE NOT YET BEEN ENABLED
DOWNSTREAM OUTPUT SWITCH ASSEMBLY	SECTOR 2	**GREEN** INDICATES THAT DOWNSTREAM OUTPUT SWITCH HAS SWITCHED TO SECTOR 2 TRANSMITTER / **AMBER** INDICATES THAT OUTPUT SWITCH HAS SWITCHED TO BACK-UP BUT BACK-UP DEVICES HAVE HAVE NOT YET BEEN ENABLED
DOWNSTREAM OUTPUT SWITCH ASSEMBLY	SECTOR 3	**GREEN** INDICATES THAT DOWNSTREAM OUTPUT SWITCH HAS SWITCHED TO SECTOR 3 TRANSMITTER / **AMBER** INDICATES THAT OUTPUT SWITCH HAS SWITCHED TO BACK-UP BUT BACK-UP DEVICES HAVE NOT YET BEEN ENABLED

DOWNSTREAM OUTPUT SWITCH ASSEMBLY	SECTOR 4	**GREEN** INDICATES THAT DOWNSTREAM OUTPUT SWITCH HAS SWITCHED TO SECTOR 4 TRANSMITTER / **AMBER** INDICATES THAT OUTPUT SWITCH HAS SWITCHED TO BACK-UP BUT BACK-UP DIVICES HAVE NOT YET BEEN ENABLED
POWER SUPPLY ASSEMBLY	±12 VDC POWER SUPPLY	**GREEN** INDICATES THAT ±12 VDC POWER SUPPLY IS FUNCTIONING PROPERLY / **RED** INDICATES ±12 VDC POWER SUPPLY FAULT
POWER SUPPLY ASSEMBLY	+380 VDC POWER SUPPLY	**GREEN** INDICATES THAT +380 VDC POWER SUPPLY IS FUNCTIONING PROPERLY / **RED** INDICATES +380 VDC POWER SUPPLY FAULT
UPSTREAM/DOWNSTREAM SWITCH ASSEMBLY	INTERLOCK STATUS	**GREEN** INDICATES THAT UPSTREAM/DOWNSTREAM SWITCH IS FUNCTIONING PROPERLY
UPSTREAM/DOWNSTREAM SWITCH ASSEMBLY	SECTOR 1	**GREEN** INDICATES THAT UPSTREAM/DOWNSTREAM SWITCH HAS SWITCHED TO SECTOR 1 TRANSMITTER / **AMBER** INDICATES THAT UPSTREAM/DOWNSTREAM SWITCH HAS SWITCHED TO BACK-UP DEVICES BUT BACK-UP DEVICES HAVE NOT BEEN ENABLED
UPSTREAM/DOWNSTREAM SWITCH ASSEMBLY	SECTOR 2	**GREEN** INDICATES THAT UPSTREAM/DOWNSTREAM SWITCH HAS SWITCHED TO SECTOR 2 TRANSMITTER / **AMBER** INDICATES THAT UPSTREAM/DOWNSTREAM SWITCH HAS SWITCHED TO BACK-UP DEVICES BUT BACK-UP DEVICES HAVE NOT BEEN ENABLED
UPSTREAM/DOWNSTREAM SWITCH ASSEMBLY	SECTOR 3	**GREEN** INDICATES THAT UPSTREAM/DOWNSTREAM SWITCH HAS SWITCHED TO SECTOR 3 TRANSMITTER / **AMBER** INDICATES THAT UPSTREAM/DOWNSTREAM SWITCH HAS SWITCHED TO BACK-UP DEVICES BUT BACK-UP DEVICES HAVE NOT BEEN ENABLED

UPSTREAM/DOWNSTREAM SWITCH ASSEMBLY	SECTOR 4	**GREEN** INDICATES THAT UPSTREAM/DOWNSTREAM SWITCH HAS SWITCHED TO SECTOR 4 TRANSMITTER / **AMBER** INDICATES THAT UPSTREAM/DOWNSTREAM SWITCH HAS SWITCHED TO BACK-UP DEVICES BUT BACK-UP DEVICES HAVE NOT BEEN ENABLED
DOWNSTREAM CONTROLLER ASSEMBLY	STATUS	**GREEN** INDICATES THAT POWER IS APPLIED TO DOWNSTREAM CONTROLLER
10 MHz REFERENCE ASSEMBLY	EXTERNAL SOURCE	**GREEN** INDICATES EXTERNAL 10 MHz SOURCE IS PRESENT
10 MHz REFERENCE ASSEMBLY	GPS SOURCE	**GREEN** INDICATES THAT EXTERNAL GPS SOURCE IS PRESENT
10 MHz REFERENCE ASSEMBLY	GPS LOCKED	**GREEN** INDICATES THAT GPS SOURCE IS LOCKED ON FREQUENCY
10 MHz REFERENCE ASSEMBLY	INTERNAL SOURCE	**GREEN** INDICATES THAT SYSTEM IS USING INTERNAL 10 MHz REFERENCE
SYSTEM MONITORING ASSEMBLY	SECTOR STATUS 1	**GREEN** INDICATES THAT SECTOR 1 TRANSMITTER IS INSTALLED AND FUNCTIONING
SYSTEM MONITORING ASSEMBLY	SECTOR STATUS 2	**GREEN** INDICATES THAT SECTOR 2 TRANSMITTER IS INSTALLED AND FUNCTIONING
SYSTEM MONITORING ASSEMBLY	SECTOR STATUS 3	**GREEN** INDICATES THAT DOWNSTREAM CONTROL ASSEMBLY IS FUNCTIONING PROPERLY
SYSTEM MONITORING ASSEMBLY	SECTOR STATUS 4	**GREEN** INDICATES THAT DOWNSTREAM CONTROL ASSEMBLY IS FUNCTIONING PROPERLY
UPCONVERTER ASSEMBLY	LOW INPUT	**GREEN** INDICATES UHF INPUT IS ABOVE LOW LEVEL FAULT THRESHOLD / **RED** INDICATES UHF INPUT IS TOO LOW / OFF INDICATES HIGH INPUT FAULT
UPCONVERTER ASSEMBLY	HIGH INPUT	**GREEN** INDICATES UHF INPUT IS BELOW HIGH LEVEL FAULT THRESHOLD / **RED** INDICATES UHF INPUT IS TOO HIGH / **OFF**

		INDICATES LOW INPUT FAULT
UPCONVERTER ASSEMBLY	MUTE	**GREEN** INDICATES ALC CIRCUIT IS NOT MUTED / **RED** INDICATES ALC CIRCUIT HAS BEEN MUTED DUE TO LOSS OF INPUT SIGNAL / **AMBER** INDICATES MANUAL OVER-RIDE OF ALC1 OR ALC2 CIRCUITS
UPCONVERTER ASSEMBLY	ALC	**GREEN** INDICATES ALC CIRCUITRY IS WITHIN RANGE / **RED** INDICATES ALC CIRCUIT IS ABOVE FAULT THRESHOLD
UPCONVERTER ASSEMBLY	10 MHz	**GREEN** INDICATES 10 MHz REFERENCE IS PRESENT / **RED** INDICATES 10 MHz IS NOT PRESENT
UPCONVERTER ASSEMBLY	PLL	**GREEN** INDICATES PHASE LOCK LOOP CIRCUIT IS LOCKED TO FREQUENCY REFERENCE / **AMBER** INDICATES PLL IS LOCKED ON HOLD-OVER CIRCUIT WITH NO 10 MHz REFERENCE PRESENT / **RED** INDICATES PLL CIRCUIT IS UNLOCKED
POWER AMPLIFIER ASSEMBLY	ENABLE	**GREEN** INDICATES THAT THE DC/DC CONVERTER ON THE POWER AMPLIFIER ASSEMBLY IS ENABLED
POWER AMPLIFIER ASSEMBLY	DC OK	**GREEN** INDICATES THAT THE OUTPUT VOLTAGE OF THE DC/DC CONVERTER ON THE POWER AMPLIFIER ASSEMBLY IS WITHIN ACCEPTABLE VOLTAGE RANGE
POWER AMPLIFIER ASSEMBLY	BIAS	**GREEN** INDICATES THAT THE –5VDC BIAS VOLTAGE IS PRESENT
POWER AMPLIFIER ASSEMBLY	RF O/P	**GREEN** INDICATES THAT THE POWER AMPLIFIER RF OUTPUT IS WITHING ACCEPTABLE OUTPUT POWER RANGE

MAINTENANCE AND TROUBLESHOOTING

Problem Identification

The BTS-7010 consists of power supplies, power amplifiers, upconverters switching circuits and control circuitry. Each sled assembly contains front panel LEDs which indicate the operating status of the assembly. If an LED is Red or Amber (see Front Panel LED Indicator Table), the troubled section of the system is most likely to be in that area. The System Monitoring assembly displays various fault status conditions on a front panel LCD display. **If an effort is being made to contact the factory to assist in problem identification, please record the status of all indicators, meter readings and signal quality measurements so that these important parameters may be related to the factory.**

Repair Procedures

Repair of this transmitter assembly normally involves module level replacement. ADC maintains an adequate stock of replacement modules. If you have determined that a particular subassembly is defective and that it cannot be easily repaired at your facility, please contact the ADC Costumer Services Department. An effort will be made to provide a module on an exchange basis. It is often possible to ship replacement modules counter-to-counter or one-day UPS/Federal Express to expedite delivery.
On some occasions it is necessary to perform component level repairs. In many cases failures can be a result of poor connections somewhere in the system. Poor connections can generally be repaired with a suitable, small, grounded soldering iron. A spare parts kit of standard components is available for this translator. Please contact the ADC Marketing Department for the price and availability of the spare parts kit. Individual components can also be ordered from the Customer Services or Marketing departments of ADC. The fuses are standard and generally available at local parts distributors. The parts list provides complete manufacturer's information and part number for all standard electrical components. These components can often be obtained from local distributors. An effort has been made to select standard (off-the-shelf) components whenever possible in the product design. Replacement of the GaAsFET transistors in the field is not recommended unless performed by an experienced technician. It is important to realize that each GaAs FET operates at a specific bias voltage that must be preset before the main power supply is switched on. Failure to provide the proper bias voltage will result in rapid GaAsFET destruction. Please refer to the ADC Warranty and Material Return Authorization procedures for additional information concerning repair parts.

Periodic Procedures

The BTS-7010 is designed with components that require no periodic maintenance except for cleaning and record keeping.

The amount of cleaning necessary depends greatly on the conditions in the room. While the electronics have been designed to function well even if covered with dust, heavy buildups of dirt and insects will impede the effectiveness of the cooling and lead to shutdown or premature failure.

When it is apparent that the front panel is becoming dust covered, the top cover should be opened and the accumulated foreign material removed. A small, soft brush used in conjunction with a plastic wand-like attachment on a small vacuum cleaner is an excellent way to remove dirt. Alcohol and other cleaning agents should not be used unless you are certain that the solvents will not damage components or markings. Water based cleaners can be used if only a small amount of moisture is used. The fans or heat sinks should be carefully cleaned.

Occasionally check that all RF connections are secure, but be careful not to overtighten.

Data should be recorded for all meter readings on a regular basis. It is suggested that data be recorded once each month and that it be retained in a rugged folder or envelope for the life of the equipment. A sample format of a log sheet is included at the end of this section. Photocopies of this sheet may be used for if desired.

TROUBLESHOOTING

Problem Identification

The first step in solving a problem with the translator is identifying the nature and location of the problem. Since the translator consists of many different boards and modules, it is often difficult to determine which part is causing the problem. The best method of isolating the problem is to divide the booster into three discrete sections and determining if these sections are operating correctly. The three sections are:

- ☞ Power Supplies
- ☞ Amplifier Modules
- ☞ ALC and Control Circuits

★First, check that all RF connections between the BTS-7010, cable feed, and antennas are correct and secure.

Note the symptom(s) of the problem that is present, including the status of the LED indicators located on the front panel. If the UNIT has no output, check that the **operate/standby** control , located on the LCD display, is set to **operate**. If the unit remains inoperable, check the LED indicators on the front panels if the assemblies and verify that all indicators are lit. If an indicator is found not to be lit, the fault is most likely to reside in the section associated with that indicator.

☎TELEPHONE TECHNICAL SUPPORT

To obtain technical assistance call (724) 941-1500 8am to 5pm EST.

Please prepare the following information before calling in order to receive the best service from your Customer Service Technician.

_ Model Number

_ When the problem started

_ LED's, which are on? Off?

_ Scope or meter readings

_ Have this manual with you when placing the call.

After regular business hours your call is automatically answered by voice mail and options given. Follow the steps given to obtain assistance.

Please leave a message that includes your name, phone number, and a brief description of the difficulty you are experiencing. A customer service technician will be contacted and return your call at the earliest opportunity.

BTS-7010
MULTI-CHANNEL BOOSTER

DRAWING LIST (SUBASSEMBLIES)

Note: The following schematics can be found in Exhibit VIII (Schematics Attachment).

Bandpass Filter Assembly:

Block Diagram, Bandpass Filter Assembly 1139975

Interconnect, Bandpass Filter Assembly 1139973

The Bandpass Filter Assembly contains the following boards/modules:

Bandpass Filter Control Board 1114836

Bandpass Filter Module 1123338

Bandpass Filter Chassis:

Bandpass Filter Backplane Board 1128530

Downstream Transfer Switch Assembly:

Block Diagram, Downstream Transfer Switch Assembly 1136335

Interconnect, Downstream Transfer Switch Assembly 1121610

The Downstream Transfer Switch Assembly contains the following boards/modules:

Downstream Transfer Switch Control Board 1121614

Front Panel LED Board 1113710

SP4T Transfer Switch ..... (Part # 04-112E19)

Power Amplifier Assembly:

Interconnect, Power Amplifier Assembly 1171358

The Power Amplifier Assembly contains the following boards/modules:

Manual Control Board 1155954

Signal Cancellation Board 1156445

Signal Correction Board 1156444

Power Amplifier Board 1165711

Correction Amplifier Board 1165714

8 Section Bias Protection Board 1586-3109

Dual Output Power Supply (DC/DC Converter) Board ADC-DC380-1012

Power Supply Assembly:

Block Diagram, Power Supply Assembly 1151455

Interconnect, Power Supply Assembly 1113841

The Power Supply Assembly contains the following boards/modules:

Power Factor Correction (PFC) Board 1112214

Astec MP4/2L/1L switiching Power Supply ..... (see MP4 specification sheets)

Front Panel LED Board 1113710

Power Supply/Power Amplifier Chassis:

Power Supply/Power Amplifier Backplane Board 1121681

Upconverter Assembly:

Block Diagram, Upconverter Assembly 1175458

Interconnect, Upconverter Assembly 1152963

The Upconverter contains the following boards/modules:

Block Upconverter Board (2.5 – 2.7 GHz) 1138753

Multiplexer Assembly:

Blcok Diagram, Multiplexer Assembly 1090775

The Multiplexer Assembly contains the following boards/modules:

Multiplexer Board 1113588

Upstream/Downstream Switch Assembly:

Block Diagram, Upstream/Downstream Switch Assembly 1144128

Interconect, Upstream/Downstream Switch Assembly 1126654

The Upstream/Downstream Switch Assembly contains the following boards/modules:

Upstream/Downstream Control Board 1125362

Dual SP4T RF Switch Board 1125367

Upper RF Signal Processing Chassis:

Upper RF Signal Processing Backplane Board 1149605

Lower RF Signal Processing Chassis:

Lower RF Signal Processing Backplane Board 1149606

10 MHz Frequency Reference Assembly:

Block Diagram, 10 MHz Frequency Reference Assembly 1129658

Interconect, 10 MHz Frequency Reference Assembly 1129669

The 10 MHz Frequency Reference Assembly contains the following boards/modules:

10 MHz Reference Board 1136560

Front Panel LED Board 1113710

TrueTime GPS model 87-664 87-664

10MHz Reference Generator Board 1519-3126

Downstream Controller Assembly:

The Downstream Controller Assembly contains the following boards/modules:

Downstream Controller Board 1132140

Automatic Back-up System (ABS) Controller Assembly:

The ABS Controller Assembly contains the following boards/modules:

ABS Controller Board 1132142

System Monitoring Assembly:

Block Diagram, System Monitoring Assembly 1156006

Interconect, System Monitoring Assembly 1156005

The System Monitoring Assembly contains the following boards/modules:

LCD Backplane Interface Board 1116295

Front Panel LED Board 1113710

Switch Board 1527-3406

Control Chassis:

Control Chassis Backplane Board 1119953